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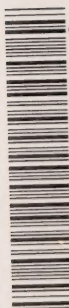
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Economic characteristics of community health centres

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ECONOMIC CHARACTERISTICS

OF

COMMUNITY HEALTH CENTRES

REPORT TO THE

COMMUNITY HEALTH CENTRE PROJECT

BY

A.P. RUDERMAN



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A.P. Ruderman,  
July 11, 1972.







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## SUMMARY AND CONCLUSIONS

1. There is no clear statistical evidence anywhere in Canada that the cost of out-patient treatment falls consistently with increases in the size of the treatment facility (as measured by the number of doctors working there)--i.e., there is no proof that economies of scale exist and a strong presumption that they do not.
2. There is thus no reason for the health authorities to promote bigness as such.
3. Group practices tend to have higher costs of operation than equivalent fields in solo practice (as measured by the ratio of operating expense to the gross income of the practice). The higher costs are associated with the use of more supporting personnel than are found in solo practice, with the availability of more elaborate diagnostic equipment, and in some cases with shorter physician-hours or work per week and per year.
4. There is some slight evidence that in some situations group practices have a lower hospitalization rate than solo practices, but the situation varies by size of group, field of practice, province, and locality, and the data are inconclusive.
5. There is thus no reason for the health authorities to promote group practice, as against solo practice, in the hope of achieving savings in the cost of out-patient and hospital treatment.
6. There is stronger evidence that group practice of the community-clinic type (as observed in a few localities in Ontario and Saskatchewan) has a lower hospitalization rate than either solo or physician-sponsored group practice, and that the resultant savings more than makes up for higher initial costs of out-patient treatment in such clinics. The interpretation of this evidence involves many non-economic factors.
7. There would thus be economic reasons to promote the community-clinic form of group practice, if a study of the non-economic factors of physician and patient motivation were to lead to a reasonable presumption that the cost-saving behaviour presently observed in a few instances could be generalized.

8. If it is desired to promote the construction of community clinics or health centres, the cost of money is the single greatest reducible element of capital cost. The greatest savings would therefore arise from lower interest rates, and interest-rate concessions or subsidies could also furnish an incentive to build.
9. In general, savings arising from transfers of function (both transfers of patient care from hospitals to community health centres and transfers from physicians to other staff within centres) can produce savings in the total cost of health care to society only when there is a corresponding reduction in the supply of the factor whose demand is reduced by the transfer.
10. Savings in some elements of cost can be achieved by centralizing services, but the amounts generated in this way are often, though not always, trivial.
11. The imperfections of the labour market for health services personnel raise costs to the extent that optimal staffing patterns cannot be realized. A central agency to provide for the rapid and timely exchange of information on vacancies and job-seekers in all health occupations would benefit the institutions providing health care, the personnel in question, and the institutions that educate and train them.
12. The absence of references to the quality of medical care in the study of economic characteristics is deliberate, since it was felt that this subject--while of prime importance in the interpretation of the economic data--should in the first instance be considered by technical experts in the matter.

## INTRODUCTION

In 1972 three differing viewpoints can be said to characterize the field of medical care. Consumers worry about access to health care. Physicians worry about their fees and incomes. Politicians worry about the cost to the community.

In the pre-medicare era, consumers also worried about cost, but the fact that the cost of hospital and physician care no longer involves substantial out-of-pocket expenditure has created a new situation in which access to service is more important to them than what the province (as surrogate for the patient) has to pay out.(1)

In the pre-medicare era, the providers of medical care also worried about cost to the extent that the physician-patient relationship was financial as well as technical. For many years physicians' fees bore witness, by their relative stability, to the effect of an open market for health services in which changes in the fee of an individual practitioner might -- depending on the elasticity of demand for his particular services -- result in loss of patients to competitors or poorer collections for work performed and billed.

The concern with the cost of medical care that has led to the current study of community health centres has its origins in the changes in the financial side of medical practice brought about by medicare. While the situation is still somewhat fluid, the following changes may be singled out:

1. The demand for physician care has increased. Using the economic definition of effective demand as "wants backed up by money" medicare has added to the previous demand those wants for physician service that were not previously backed up by money (principally demand on the part of the low-income working population not eligible for welfare

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(1) See Despres, R. et al., "Control Measures for Physicians' Fee payments under Provincial Health Insurance Schemes", Canadian Journal of Public Health, July-August 1971, p.272 in particular.

benefits and the demand for more expensive types of elective care and surgery on the part of most of the population). While it had been felt(1) that economic and social class exerted an influence on the demand for health care regardless of the method of financing, at least one subsequent study(2) indicated that, over a period of more than five years of medicare, the behaviour of different population groups tended to coalesce into a single common pattern of seeking physician care when ill health was perceived.

2. For that portion of demand which is generated by physicians rather than patients (as illustrated by comparisons of first and subsequent visits to doctors for a given spell of sickness) medicare also meant that the individual patient's financial status no longer had to be taken into account by the conscientious physician in suggesting a follow-up visit. It has also been observed(3) that many "courtesy" services (unconnected with the patient's financial status) that were not billed in the pre-medicare period are now billed by physicians.
3. Loss from bad debts and the cost of collection have virtually disappeared as provincial medicare plans rather than individuals have become responsible for paying the physician. This, indeed, was explicitly taken into account by those provincial plans that asked physicians to accept 85 or 90 per cent of the prevailing fee schedule as payment in full in view of the improvement in collections.

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- (1) Badgley, R. et al., "The Impact of Medicare in Wheatville, Saskatchewan, 1960-1965" Canadian Journal of Public Health, March, 1967.
  - (2) Unpublished study of the Yorkton, Saskatchewan, region by H. Fraser and W. Clarke, 1969.
  - (3) Snell, B. "The Changing Position of the Physician in Canadian Hospitals", Medical Care, November-December 1969, Supplement.

4. In the ten-year period of "lopsided protection" from 1958-60 to 1968-70 when most individuals were covered by provincial plans for the cost of hospitalization and some hospital-based out-patient diagnostic services, but not for out-patient medical care, doctors developed "bad habits" in the sense of hospitalizing patients for services that could have been performed on an out-patient basis (laboratory, x-ray, and other diagnostic services) because as an in-patient there would be no out-of-pocket expense. To the extent that this has carried over into the "full protection" era, the hope exists that appropriate incentives--whether psychological or financial--can shift at least some of this care to an out-patient basis once again, with a corresponding saving over the high cost of hospitalization.
5. With collections in all instances virtually guaranteed, the fee structure in the different provinces is also translated directly into a set of incentives for physicians (a) to analyze the structure so as to maximize revenue from the most sophisticated billing practices possible, and (b) to emphasize the most remunerative procedures in their practice when not ethically contraindicated.

It is against this background that the proposals for community health centres as a cost-saving system must be viewed.

From an economic viewpoint it is difficult to distinguish "community health centres", however defined, from the group practice of medicine in general. Both systems tend to group medical practitioners and supporting staff under one roof, pooling patient records, providing round-the-clock access, and engendering a more humane life for the physician (time off for professional training and leisure pursuits, fewer hours of work per week) and a different style of practice based on the availability within the group or centre of laboratory and x-ray facilities and other diagnostic aids that, by reason of cost, are more common in hospitals than in the offices of solo practitioners. In addition, because the scanty available statistics tend to distinguish between solo and group practice rather than between community health centres and other forms of group organization, the following discussion, with the exception of Saskatchewan and of specific localities in Ontario, is based on comparisons of group and solo medical practice.



## INTUITIVE COMMON SENSE AND ITS LIMITS

Intuitive common sense(1) has led a number of economists to assume that group practice, and large groups in particular, would exhibit economies of scale and provide medical care at lower cost than solo practice through better utilization of premises, supporting staff, diagnostic equipment, etc., and by a rational division of labour, whether they were physician sponsored or community sponsored. This point of view has become so common that the unsupported assumption that economies of scale would exist underlies much of the present interest in group practice and community health centres. The statistical research that serves as background to this paper was designed to find such evidence if it existed in Canada.

Another general claim--this time supported by evidence from outside Canada rather than by intuition alone--is that some forms of group practice, particularly the forms that approximate the concept of the community health centre, provide indirect economies through the performance of more procedures on an out-patient basis than in solo practice, which is reflected in lower rates of hospitalization of patients and a lower total cost of care. This is sometimes reinforced--again intuitively--by the idea that community centres, and to some extent other groups, tend to practice more preventive medicine than do solo practitioners (particularly in the use of screening techniques) and that this preventive activity has an eventual payoff in lower utilization of health services and therefore, presumably, lower cost. Again, insofar as Canadian data permit, an attempt has been made to examine comparative hospitalization rates statistically.

## REASON FOR EMPHASIS ON CANADIAN EXPERIENCE

The field of health economics is still in its infancy in Europe, and most of the theoretical and speculative analysis, as well as most of the statistical studies made to date, come from the United States, where this line of economic investigation has been rather lavishly financed by the public sector. In addition, individual large medical groups and group systems, and

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(1) Cf. Boan, J. Group Practice, Royal Commission on Health Services Monograph, Ottawa, The Queen's Printer, 1966.

a variety of voluntary non-governmental organizations such as Blue Cross and Blue Shield (hospital and medical nonprofit insurance), not only finance research but publish their own books and journals to publicize the findings. Much of the American literature has been widely, and rather indiscriminately, quoted in Canada, as if the findings were directly applicable here.

Canadian and American group practices differ in many respects, but the most significant difference is revealed by the common American term "pre-paid group practice". In a country where general public provision for the costs of hospitalization and out-patient medical care does not exist, formal groups provide a method of prepayment (or "insurance") by agreeing to contracts which provide that the patient (or his employer) makes regular monthly contributions established on a cut-and-try or actuarial basis to cover the cost of medical care, which care is then guaranteed by the group. This leads to a closed form of practice in which the patient seldom goes outside the group of which he is a member to seek care, because care within the group has been prepaid while care outside the group involves out-of-pocket expenditure that will not be reimbursed except under special circumstances. The more recent American "health maintenance organization" represents an effort to expand the prepayment group to cover larger local populations.

Planning is facilitated in the case of closed systems because the number of people likely to use the group service can be estimated with relative accuracy. It must be emphasized that this system does not exist in Canada, where provincial medicare plans make it possible for group "members" to seek care elsewhere without additional expense and where a nominally "closed" group may treat non-members on a fee-for-service basis.

The American experience has frequently been cited in support of the claims for indirect economies through lower hospitalization rates in group practice.(1) It has also been contended(2) that these indirect economies are largely illusory

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- (1) Cf. Roemer, M. and DuBois, D.M. "Medical Costs in Relation to the Organization of Ambulatory Care", New England Journal of Medicine, May 1 1969, for one among many references to this topic.
  - (2) Klarman, H.E. "Economic Research in Group Medicine", in New Horizons in Health Care, Proceedings of the First International Congress on Group Medicine, Winnipeg, April 26-30, 1970.

because the same organization will have different rates of hospitalization in different geographical areas; the lower hospitalization may result from cash incentives to the members of the medical practice and from direct ownership of hospitals, as in the case of Kaiser Permanente; the result may come from difficulty in obtaining hospital staff appointments, as was the case for a number of years in the Health Insurance Plan of Greater New York; finally, the style of medical practice varies regionally within the United States, and varies even more between the United States and Canada. An attempt has been made in this paper to find Canadian evidence for similar indirect economies.

## STATISTICAL FINDINGS

### ALTERNATIVE APPROACHES TO COST

One of the difficulties in studying economies in different forms of medical practice is the problem of choosing the appropriate concept of cost. The cost to governments is relatively easy to obtain because it is represented by the amount spent in paying physicians' bills submitted to the provincial medicare plans. Such information is routinely recorded in total, with varying degrees of breakdown into analytic or accounting categories, but from the conceptual point of view this measure suffers from the fact that it is a measure of the cost of a service output rather than a resource input. Using the terminology of national accounts, total medicare billings can be taken as the income arising in the medical care subsector of the economy, while viewing this income in terms of distributive shares (i.e., returns to the factors of production) the total would have to be decomposed into payments to other factors of production (rent, equipment, supporting staff, etc.) and the amount retained by physicians.

A serious effort was made for purposes of this study to obtain information on the breakdown of costs in different kinds of medical practice, and--although some not particularly representative figures are cited below--the attempt must frankly be rated as a failure. The costs as declared for income tax purposes suffer a number of limitations, are, of course confidential in nature, and cannot be analyzed by group/solo practice or by size of practice. In an endeavour to obtain material directly from individual physicians and medical groups, it was found that most physicians, and the business managers and managing committees of most groups visited, felt that this information was confidential and could be not released.

Some limited information for 24 medical group clinics in 1968 is shown in Table 1. The groups were located in the provinces of Alberta, British Columbia, Ontario, Quebec and Saskatchewan. Visits to six clinics in Ontario, Manitoba and Saskatchewan tended to corroborate the data shown in the table.

Using the statistics of physician's earnings compiled by the Department of National Health and Welfare from income tax sources for purposes of comparison, since "all physicians" is still preponderantly weighted towards solo practitioners, it would appear that the cost of medical practice (measured as expenses of operating the group clinics) rises with the size of the group. Thus the expense ratio of 33.1% based on income tax declarations for 1968 compares with 37.0% for small groups, 42.4 for medium-sized groups, and 42.7% for one large group. Much of the cost difference among the three sizes of group can be attributed to non-physician payroll expenses, with 1.9 employees for physician in the small groups studied, 2.3 in the medium-sized groups, and 2.9 in the one large group. Administrative expense also increased with clinic size, not only in dollar amount, but also as a per cent of gross income from medical practice. The difference between the medium-sized groups and the single large clinic is so small that it could be accounted for entirely by the slightly higher personal benefits (pension scheme, etc.) in the large clinic. The one hint at possible economies of scale is the lower expense percentage for medical supplies in the single large clinic, compared with the medium-sized groups, but all observations based on this study relate to small numbers to which no general statistical significance can be attached.

A subsequent analysis of 24 solo and group practitioners in Ontario also tended to corroborate the findings in Table 1, with a total expense ratio of 36.1 per cent of gross professional earnings and occupancy costs of 7.6 per cent.

While there may be a temptation to focus on the actual physician earnings reported in the study, it should be remembered that the sample is small and unrepresentative and that, for example, the high incomes in the large clinic can be explained in large part by differences in the proportions in which general practice and the various medical specialties were represented.

The general distribution of the expenses of medical practice in Canada, as revealed by analysis of income tax records, does little to reinforce any possible hypotheses about the nature of differences in operating expenses. Table 2 shows some comparisons of expense ratios for 1969 broken down in a variety of ways, showing the numbers of physicians having different levels of "total operating expenses as a per cent of gross income from medical practice" as defined in Table 1. Except for certain obvious conclusions (that expenses would

Table 1

Expenses of practice per physician in dollars and as a per cent of gross professional earnings, all Canadian physicians (\*) and 24 groups clinics, 1968

Income or expense category	All physicians		Groups with 5-9 physicians		Groups with 10-19 physicians		One large group clinic	
	\$	%	\$	%	\$	%	\$	%
Gross income....	42,783	100.0	47,250	100.0	49,400	100.0	60,700	100.0
Payroll expense	-	-	8,100	17.1	9,350	18.9	12,500	20.6
Medical and surgical supplies.....	-	-	2,300	4.8	2,600	5.3	2,250	3.7
Building and occupancy expense	-	-	3,300	7.0	3,750	7.6	4,350	7.2
Administration and general expense..	-	-	2,900	6.2	4,050	8.2	5,100	8.4
TOTAL OPERATING EXPENSES.....	14,168	33.1	16,600	35.1	19,750	40.0	24,200	39.9
Physicians' personal benefits.....	-	-	900	1.9	1,200	2.4	1,700	2.8
TOTAL EXPENSES.	-	-	17,500	37.0	20,950	42.4	25,900	42.7
Net Income.....	28,615	66.9	29,750	63.0	28,450	57.6	34,800	57.3
Employees per physician.....	-	-	1.91	-	2.32	-	2.89	-

Source: First two columns, Earnings of Physicians in Canada, 1958-68, Health Care Series, No. 25, Department of National Health and Welfare, June 1970. Last six columns: study of 24 group practices and site visits.

\* In computing the data for "all physicians" salaried physicians and those earning less than stipulated minimum (designed to eliminate house staff and part-time physicians) were excluded. In the study of 24 groups, salaried doctors were excluded from operating expense and their salaries were included in computing income per physician.

appear to be lower in the Maritimes than in Western Canada, or that anaesthesiologists have lower expenses than other physicians) there is really not much to see. Differences in the frequency distribution of physicians by expense ratio do not show any patterns of systematic variation by size of community, the differences by specialty are almost self-evident, and the variation among provinces seems larger than most of the other variation present. It is reported that various provincial Medical Associations, who have received in confidence similar data in greater detail than could be provided here, have been equally perplexed at the reasons for the variation observed and have not been able to identify any consistent pattern.

The analysis by size of community given for Quebec in Table 2 could be repeated for any other province that had a sufficient number of physicians to provide significant figures, as could the comparison for general practice and ten specialties given for Ontario, but the data shown serve to make the point that the analysis of expense ratios shows no significant pattern of variation consistent with any known explanatory hypothesis and that it is not, in any event, possible to use the data to compare group and solo practice.

Lest the study of expense ratios be dismissed out of hand as unproductive, however, it should be noted that the wide and apparently meaningless variation of the expense ratios based on tax data really point to one positive conclusion: that the expense of conducting a medical practice--apart from the amount retained as personal income by the practitioner--can and does in fact cover a wide range. In consequence, it can be assumed that the non-physician costs of community health centres will vary just as widely depending on the planning decisions that are made when such centres are established. The capital cost of buildings (or rental of equivalent premises) will vary with type of building and location. Personnel costs will vary with local wage rates as well as the mix of persons and skills employed. In community health centres as now operating in Canada, it should be noted, the costs of the services of psychologists, social workers, etc., are met by the group out of fee income and do not appear as "cost to government" unless a capitation payment formula is adopted that makes provision for such items. Major items of diagnostic equipment are available in a variety of qualities and styles with a considerable range of price. The decision as to the type, size, and location of premises, the construction standards, and the choice of equipment will determine the cost in very large part.



Table 2

Percentage distribution of physicians by expense ratio groups, 1969  
 (except for rounding error, figures for each horizontal row add to 100%)

	Expense under 20%	20 to 30%	30 to 36%	36 to 42%	42 to 48%	48 to 55%	Over 55%
<u>All physicians</u>							
Newfoundland	38	32	8	9	2	2	9
Prince Edward Island	11	25	13	19	6	5	22
Nova Scotia	29	31	13	13	7	5	4
New Brunswick	21	33	10	15	7	5	7
Quebec	25	26	13	14	8	6	7
Ontario	19	27	14	16	8	7	8
Manitoba	18	32	12	12	8	7	11
Saskatchewan	11	27	15	16	14	7	10
Alberta	19	25	12	14	10	7	12
British Columbia	15	23	14	18	13	9	8
<u>General Practitioners</u>							
Newfoundland	25	33	13	11	4	6	10
Prince Edward Island	12	26	12	29	7	6	14
Nova Scotia	22	28	14	16	9	6	5
New Brunswick	18	25	9	20	10	7	10
Quebec	12	26	15	17	11	10	12
Ontario	12	24	15	20	11	8	9
Manitoba	14	31	15	15	9	7	10
Saskatchewan	10	27	18	15	13	8	9
Alberta	11	19	14	17	13	10	17
British Columbia	7	15	18	22	18	10	10

Table 2 (contd.)

Percentage distribution of physicians by expense ratio groups, 1969  
(except for rounding error, figures for each horizontal row add to 100%)

	Expense under 20%	20 to 30%	30 to 36%	36 to 42%	42 to 48%	48 to 55%	Over 55%
<u>Quebec general practitioners, by size of community</u>							
Under 2,000 population	9	12	10	13	16	19	22
2 but under 10,000	12	18	12	19	15	10	11
10 but under 35,000	11	23	20	19	11	5	7
35 but under 100,000	14	32	19	16	12	6	-
100 but under 250,000	20	6	-	6	-	-	-
250,000 but under 1 million	15	37	15	11	9	6	9
Montreal	13	25	17	19	8	9	10

(the symbol "-" means data withheld to preserve confidentiality)

Ontario physicians, by specialty

General practice	12	24	15	20	11	8	9
Pediatrics	9	33	21	15	8	7	8
Internal medicine	24	29	11	15	6	7	8
Psychiatry	36	25	8	8	6	2	6
Anaesthesiology	69	13	6	3	3	2	4
General surgery	27	36	11	11	7	4	5
Orthopaedic surgery	19	33	15	11	6	6	9
Obstetrics and gynaecology	15	44	16	14	1	5	5
Urology	30	33	18	9	3	3	3
Ophthalmology	18	37	11	16	6	5	8
Otolaryngology	24	42	14	10	3	3	3

Source: Department of National Health and Welfare, based on income tax statistics. Percentage distribution calculated by the author.

Only in the area of "current consumables" (medical and surgical and office supplies) and services such as laundry does there appear to be room to achieve economies that are independent of the standards of construction and staffing, and these are likely to be minor, as discussed below.

#### PROVINCIAL MEDICARE PLANS AS A SOURCE OF DATA

In view of the difficulties of obtaining cost and income information from individual practitioners and groups and the impossibility of inferring group-solo differences from income tax data as presently compiled and tabulated, a number of special studies were initiated on the basis of provincial medicare plan records. The goal of these studies was to estimate group-nongroup differences in the cost per patient handled, and in the hospitalization rate, on the basis of bills submitted by physicians to medicare plans. The physician profile was the most readily available item of information in the plans studied, though wherever possible it was supplemented by data tabulated per patient as well as per doctor. It will be observed that the majority of the figures come from western provinces. At the time the study was undertaken, the Quebec medicare plan had been in operation too short a time for useful data to be available, and the OHSIP records for Ontario had not yet been extended to cover the entire population--with data for nearly half the population unanalyzed in the records of the various insurance companies that acted as interim agents for the provincial government through 1971. Substantial well-organized data existed for Nova Scotia, but there were so few group practices that group-nongroup comparisons would not be meaningful. For the same reason, no attempt was made to analyze the data for the other Maritime provinces where solo practice is also the mode.

Saskatchewan had the longest history of provincial medicare, and its medical care insurance commission had already undertaken a variety of analyses that paralleled in large measure those needed for this study. An independent study of solo and group practices and community clinics was available, and it was also possible to separate community clinics from other groups in the medicare records. In Manitoba the somewhat younger medicare plan was being organized on similar lines and some 1970 data had already been used as raw material for an M.A. thesis in economics at the University of Manitoba. Alberta data were also readily available, and finally in British Columbia the analysis was facilitated by the availability of an independent classification of physicians into solo and group practice.

The statistics based on medicare records must be interpreted with caution. At the time the study was made, the programs in Alberta and Manitoba, for example, were still on fairly recent origin and a number of billing anomalies (e.g. Pathology in one instance being billed as Internal Medicine) may effect the comparisons to some degree. Such instances can be expected to decline in importance as routines are developed, and it is hoped that the continuing review of medicare program data by the Department of National Health and Welfare in co-operation with the provinces will lead to improved comparability and eventually to the establishment of statistical series that will permit the study of variations over time.

#### FINDINGS FROM ALBERTA MEDICARE DATA

Solo practice predominated in specialty medical practice in Alberta, while groups were most important in general practice and in mixed general and specialty practice. In the year ending September 30, 1970 there were 409 medicare billing numbers assigned to solo general practitioners and 251 numbers assigned to doctors in groups that may have included as many as 700 doctors. Billing numbers were assigned to 401 solo specialists and to 443 doctors in mixed general-specialty groups. Doctors in general practice and mixed general-specialty groups were fairly evenly distributed among small groups (2 to 4 doctors) where general practice predominated, and groups with 5 to 9, 10 to 19, and 20 or more doctors. These size classes were adopted as standard for all the provincial analyses undertaken, and permitted not only comparisons between solo and group practice, but between groups of different sizes.

Summary data for general practice and for mixed general practice-specialist groups are given in Table 3. In brief, the findings are that doctors practising in groups in Alberta appear to provide a greater out-put of services per doctor than those in solo practice, though fewer office visits per patient were recorded. This implies more services per visit and is consistent with our knowledge of laboratory and radiological diagnostic services provided by groups and with the within-group referral patterns of mixed general-specialty practice groups. There is little indication that they make less use of the hospital in group practice, though the solo-group hospitalization differential varies from the larger to the smaller cities and both differ from rural areas. Where sufficient data were available for group-nongroup comparisons within individual specialties, the same relationship or lack of relationship appeared as in the case of general practice and mixed general-specialty groups. Group practitioners also did more of their own diagnostic and laboratory work than did solo practitioners.

A study of this kind, based on medicare billing records, naturally cannot indicate whether groups used more supporting personnel than solo practitioners to achieve their higher output, nor whether a greater volume of patients handled with consequent higher billings necessarily meant higher taxable net incomes for the physicians in question.

Another shortcoming of the Alberta data is the lack of "patient profiles" to supplement the doctor profiles. For example, Table 3 indicates for Edmonton and Calgary more hospital admissions per doctor in small groups than in solo or large-group practices. To know what this difference means, it would be necessary to have complete data on a patient basis to be able to observe the pattern of referrals within and between solo and group practice. Without such information, we cannot know whether the observed difference is due to different attitudes towards hospitalization on the part of solo and group practitioners, or is merely a by-product of different specialty mixes and referral patterns--in a sense, a statistical artifact.

In the search for possible economies of scale, it is interesting to observe that there is no systematic relationship between the size of group (or group vs. solo practice) in the average fee per office visit or average fee per procedure, nor in the fee per hospital visit and number of hospital visits per admission. Each of these items can indeed be observed to vary from one size and type of practice to another, but in the case of general practice and mixed general-specialty groups, in particular, these items show no consistent relationship to size of group--with solo practice showing up higher in one category, small groups in another, and larger groups in yet another, in an apparently random pattern.

A number of the observed variations presumably have a simple "exogenous" explanation. Thus in Table 3 it will be noted that the smaller mixed general-specialty groups in Edmonton and Calgary have higher fees for all services and for office visits than do other practices, and that they perform particularly few diagnostic and laboratory procedures. This would lead one to suppose a concentration in certain specialties, but unfortunately this hypothesis cannot be verified from the medicare data in the form in which they are compiled. A complication factor is that the Alberta Medical Association fee schedule provides for a range of fees rather than a single dollar amount for each billing item.

Table 3

Medicare records of activity of Alberta physicians  
by type and size of practice, year ending September 30, 1970

## GENERAL PRACTITIONERS

	Edmonton/Calgary			Other urban			Rural		
	Solo	2-4	5-9	Solo	2-4	5-9	Solo	2-4	5-9
Number of doctors...	245	30	31	34	8	16	130	80	77
Office visits per doctor.....	3452	4155	2716	2501	5148	1513	2632	2963	2548
Hospital admissions per doctor.....	126	173	89	142	744	135	399	459	308
Visits per admission.....	8.05	5.79	6.45	6.59	8.53	8.06	4.46	4.56	4.14
Major and minor procedures.....	319	435	236	219	784	368	275	409	306
Diagnostic & lab. procedures.....	119	150	152	76	106	151	100	78	169
Other (incl.X-ray)..	728	637	754	780	723	537	453	552	733
Average fee per office visit.....	\$7.10	6.60	6.89	7.16	5.89	6.30	6.11	5.83	6.65
Average fee all services.....	\$7.19	7.11	7.24	8.22	6.11	8.27	8.27	6.74	6.89

## MIXED GENERAL-PRACTITIONER AND SPECIALIST GROUPS

	5-9	10-19	20 & over	5-9	10-19	20 & over	2-4	5-9	10-19
Number of doctors..	42	79	104	17	99	24	14	46	14
Office visits per doctor.....	960	1258	2228	2214	1894	2531	3019	2406	1585
Hospital admissions per doctor.....	23	47	93	178	106	97	235	255	138
Visits per admission.....	11.13	9.83	8.38	5.44	7.45	5.80	4.39	6.57	7.29
Major and minor procedures.....	76	141	352	264	320	335	266	334	314
Diagnostic & lab. procedures.....	2	102	1072	500	864	929	72	137	189
Other (incl.X-ray)	1673	1474	1100	744	721	1438	556	628	655
Average fee per office visit.....	\$8.57	6.97	7.59	6.81	5.98	6.47	6.45	5.93	5.57
Average fee all services.....	\$16.79	10.79	10.15	7.67	7.62	8.09	8.09	7.16	7.69

Source: Compiled from data of the Alberta Health Care Insurance Commission by D.F. Haythorne, Department of Community Medicine, University of Alberta.

Table 4

Numbers of group practices, physicians, and average income per  
physician, by size of group, British Columbia  
year ending March 31, 1970

	General Practice Groups	Mixed GP and Specialty	Mixed Specialty	Same Specialty	TOTAL
<u>2-4 doctor groups</u>					
No. of groups.....	73	16	2	23	114
No. of physicians..	171	44	6	55	276
Average income.....	39,694	44,058	182,273	78,471	51,217
<u>5-9 doctor groups</u>					
No. of groups.....	11	13	1	5	30
No. of physicians..	68	78	6	22	174
Average income....	32,343	43,674	63,351	88,057	45,536
<u>10-19 doctor groups</u>					
No. of groups.....	1	10	-	1	12
No. of physicians..	8*	105	-	9*	122
Average income....	36,269	37,827	-	50,987	38,696
<u>20 or more doctors in group</u>					
No. of groups.....	-	4	-	1	5
No. of physicians..	-	84	-	31	115
Average income....	-	37,461	-	30,498	35,484
<u>TOTAL</u>					
No. of groups.....	85	43	3	30	161
No. of physicians..	247	311	12	117	687
Average income....	37,559	40,076	122,812	65,449	44,937

Source: B.C. Medical Service Commission and University of British Columbia. Compiled by Professor R.G. Evans.

\* One or more physicians were group members for only part of a year and earned less than \$10,000, and were excluded from the calculation.



## BRITISH COLUMBIA

The available medicare data for British Columbia did not permit estimates of hospitalization rates to be made, but the basic classifications of physicians into group and nongroup practitioners, and by size of community, are considered accurate and worthy of attention. The distribution of group practitioners by type and size of group is shown in Table 4.

Small groups of 2 to 4 associated physicians comprised 114 of the 161 groups in the province, and accounted for 275 of the 675 group practitioners. General practice and single-specialty groups tended to predominate. It is interesting to note that average incomes tended to be large and to fall with increasing size, for each type of group. Using average income as a measure of activity, it would appear that the size of group made very little difference in the output of the physician. When comparing group and solo practitioners, as in the data of Table 5, the average income (presumed output) of physicians in groups shows a higher level than solo practice in some sizes of community and fields of practice, and a lower one in others.

The breakdown by size of community in Table 6 shows a clear dominance of the group form of practice for "non-practising specialists" (as defined in the note to the table) in the university centre, and among general practitioners in low-population areas. When group and nongroup practitioners are compared, solo practice yields slightly more output per physician except in Vancouver, where group specialists had a clear advantage of 32.4 per cent more output. This, however, may relate more to teaching hospital connections than to economies of scale. In the case of general practitioners, no clear advantage of group over solo practice emerges. This is consistent with the findings for the other provinces included in this chapter.

## FINDINGS FROM A SHORT-TERM MANITOBA STUDY

Data from Manitoba medicare for one month in 1970 were analyzed by J.W. Mackintosh.(1) His principal findings of interest for the present study are summarized in Table 6. The short period of observation undoubtedly gives rise to more variation than would be observed in data for a full year, but the indications are nonetheless interesting.

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(1) Mackintosh, J.W., Comparative Analysis of Health Care Delivery Systems, unpublished Master's thesis, University of Manitoba, February 1971.

Table 5

Numbers and average income of physicians working in  
British Columbia in the year ending March 31, 1970,  
by group status and size of community

	University Centre	Cities over 100,000 popula- tion	Areas of 25,000 to 100,000 popula- tion	Areas 10,000 to 25,000 popula- tion	Areas under 10,000 popula- tion	Whole Province
<u>Practising specialists*</u>						
No. in groups	40	6	47	35	1	129
Average income	59,870	44,435	43,325	43,228	24,059	48,331
No. non-group	501	101	45	57	-	704
Average income	45,233	46,502	50,578	46,083	-	42,585
<u>Non-practising specialists*</u>						
No. in groups	103	7	10	6	1	127
Average income	70,610	60,080	85,981	66,173	46,989	70,844
No. non-group	68	28	16	15	-	127
Average income	37,777	43,881	33,907	57,845	-	41,005
<u>General practitioners</u>						
No. in groups	171	21	95	127	17	431
Average income	37,720	31,332	35,627	35,973	38,090	36,289
No. non-group	391	96	123	147	3	760
Average income	35,669	30,991	40,609	35,452	26,108	35,798
<u>All physicians</u>						
No. in groups	313	34	152	168	19	687
Average income	51,202	39,563	41,320	38,563	37,820	44,938
No. non-group	960	225	184	219	3	1,591
Average income	40,810	39,559	42,464	39,753	26,108	40,651
Grant total	1,273	259	336	387	22	
Average income	43,365	39,559	41,946	39,236	36,222	

Source: See Table 4.

\*"Non-practising specialists" are defined as specialists in diagnostic radiology, anaesthesiology, pathology, bacteriology, public health, and physical medicine, and "practising specialists" as all others.

In terms of volume of work, total services provided per doctor in solo practice were substantially lower than in any group setting. In internal medicine, solo practitioners were more productive than members of small and medium groups, with the single large multi-specialty group standing well ahead of any other size of practice. In obstetrics and gynaecology the differences were too small to be considered significant on the bases of one month's observations. Surgery was not covered by the study and, in any event, would have been difficult to compare with the other activities because bills per surgical procedure tend to include hospital visits that are billed separately by other practitioners.

In terms of hospitalization, the ratio of hospital visits per initial office visit was computed from Mackintosh's original data in numbers of visits. While a steady decline in hospitalization with increase in the size of practice was observed for general practice, by and large the use of the hospital by general practitioners appeared to be low. In the case of internists, both medium and large multi-specialty groups and solo practitioners showed far more hospitalization than did small single-specialty groups, but in general the practice of internal medicine appeared to be hospital based, with hospital visits outnumbering initial office visits for solo and all sizes of group practice.

The Mackintosh study was limited to physical units of service and did not enter into the study of costs.

Another interesting but inconclusive study was made by the Manitoba Health Services Commission for the town of Churchill, where three general practitioners left the community in 1970 and were replaced by three physicians of the Northern Medical Unit of the University of Manitoba. The University also made provision for visiting specialist services.

Since the original practitioners were paid on a fee-for-service basis and the replacement group were on yearly salary, the comparison between fee-for-service practice in 1969-70 and salaried practice in 1970-71 might hopefully have approximated the characteristics of a controlled experiment. Unfortunately, the period under study was marked by some population decline, owing to the closure of the NASA facility, and it is not known to what extent the University doctors referred difficult cases and major surgery to Winnipeg. In view of the multiplicity of variables that changed during the study period, the results are difficult to interpret.

Table 6

Summary data for solo and group practices in Manitoba  
one month in 1970

	<u>General Practice</u>	<u>Internal Medicine</u>	<u>Obst./ Gyn.</u>
<u>Total services per doctor:</u>			
Solo practitioners	585	911	532
Small single-specialty groups	1,474	777	552
Medium multi-specialty groups	1,080	551	572
Large Multi-specialty groups	1,107	1,522	588
<u>Hospital visits per initial office visit</u>			
Solo practitioners	0.43	2.92	n.a.
Small single-specialty groups	0.30	1.06	n.a.
Medium multi-specialty groups	0.20	3.48	n.a.
Large multi-specialty group	0.06	2.86	n.a.

Note: Ratios computed from original data in numbers of visits. No comparable data on hospital visits were available for obstetrics/gynaecology.

Source: Compiled from tables in J.W. Mackintosh, A Comparative Analysis of Health Care Delivery Systems, a thesis presented to the Faculty of Graduate Studies, University of Manitoba, February 1971.

The figures in Table 7 do indeed show substantial declines from 1969-70 to 1970-71, in surgery costing over \$50, initial office visits, subsequent office visits, laboratory tests, and hospital visits, as well as a slight decline in house calls. The decline in initial office visits leads one to suppose that there was simply less demand for medical care in the second year of the study. The ratio of hospital visits to initial office visits actually rose slightly in the same period, and the fee per unit of services tended to rise except for surgical procedures. The University physicians sent "dummy bills" to the health services commission for statistical recording purposes, but the incentive for accuracy and the choice of billing items were possibly not what they would have been if the bills had been productive of income.

#### SASKATCHEWAN

For purposes of this report, data were provided from a study of the files of the Saskatchewan Medical Care Insurance Commission. Repeated cross-section random samples of about 40,000 families were selected for the years from 1963 through 1968. The method of classifying patients by clinic is compatible with that of D.O. Anderson and A. Crichton(1) and the special study was made because much of the basic computer work had already been done for purposes of a Ph.D. dissertation and because the Anderson-Crichton study focussed on a wider range of problems while, in the present instance, the emphasis was on average billings per patient as a measure of "through-put" and on the ratio of billings for hospital visits to billings for initial office visits as a measure of hospitalization.

Since Saskatchewan is the only province in this study to provide separate information for community clinics, some of the technicalities that affect the interpretation of the data deserve special attention.

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(1) Anderson, D.O. and Crichton, A. What Price Group Practice?  
Unpublished monograph, University of British Columbia, 1972.

Table 7  
Physicians' Services and Fees in Churchill,  
Manitoba, 1969-71

<u>Item</u>	<u>1969 - 1970</u>		<u>1970 - 1971</u>		<u>Per cent change, 1969-70 to 1970-71</u>	
	<u>Services</u>	<u>Fees</u>	<u>Services</u>	<u>Fees</u>	<u>Services</u>	<u>Fees</u>
1. Initial Office Visit	5,634	44,024	4,626	36,325	- 17.8	- 17.4
2. House Calls	1,090	13,070	1,070	13,187	- 1.8	+ .9
3. Subsequent Office Visits	2,752	11,557	2,337	9,947	- 15.1	- 14.0
4. Surgery over \$50	861	31,751	623	20,236	- 27.6	- 36.3
5. Laboratory Tests	844	1,076	687	921	- 18.6	- 14.4
6. Hospital calls	1,116	19,796	935	17,543	- 16.2	- 12.6

Source: Manitoba Health Services Commission, Research, February 1972.

In the first place, billings for "hospital visits" really represent a rather complex measure. In an attempt to curb possible abuses in billing for casual hospital look-ins, the Saskatchewan Medical Care Insurance Commission arranged to pay physicians a stipulated amount for each day a patient was in hospital, whether visited or not. The amount billed as "hospital visits" really provides a measure of the length of hospitalization. The measure is complex, however, because the amount paid varies, in the case of general practice, from \$3 for the first 21 days in hospital to \$2 for days 22 to 42, and \$1 thereafter, while for a specialist (e.g. paediatrician) the fee ranges from \$5 to \$1 in five steps over the same total length of time.

Another problem in interpreting the data arises from the fact that for much of the period under review the Saskatchewan Hospital Insurance Plan maintained special contracts with the community clinics (and with a few other group practices as well) for minor surgery and certain diagnostic services. These were phased out by 1966-67 except for some contracts for x-ray work that are still in effect.

Finally, some effect is to be anticipated from the deterrent charge that was in effect in 1968 (the last year shown) and was eliminated in 1971. For 1968 part of the cost, at least in theory, was paid directly by the patient. In some instances the charge is known to have been absorbed in whole or in part by physicians who compensated themselves in turn by a shift in billing practice from lower-priced to higher-priced items in the fee schedule (e.g., from regional assessment to general assessment for the same examination).

The data in Table 8 reveal no consistent pattern for comparisons between solo practitioners and those in different sizes of group, though costs were higher for solo specialists and specialty groups than for general practice in most instances. The wide variation is also reflected in the standard deviations, which for each year were higher than the mean itself and tended to increase more than mean cost.

On the other hand, when the three community clinics are compared with other groups of similar size and type (multi-specialty groups with 5-9 doctors) the community clinics show a consistently lower average treatment cost per patient. This unquestioned difference does not arise from the difference between group and solo practice, since only groups are here compared. Some of the difference may be



Table 8

Cost per Patient by Year and by Size of Clinic  
for all Services, Saskatchewan, 1963-1968

		<u>1963</u>	<u>1964</u>	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>
Solo:	General practice	37.05	39.82	40.90	41.86	43.81	48.81
	Specialties	43.09	46.67	50.26	45.07	38.71	33.91
Groupe: 2-4 doctors	General practice	36.84	38.68	38.74	38.86	40.42	43.96
	Single specialty	45.50	47.35	40.56	40.91	52.07	42.25
	Multi specialty	50.97	54.21	45.21	47.72	61.78	54.32
Groupe: 5-9 doctors	General practice	37.50	35.90	41.43	42.82	46.30	50.07
	Single specialty	44.12	37.86	42.15	38.29	42.54	49.25
	Multi specialty	47.17	58.36	60.27	68.05	57.96	63.51
10-19 doctors	Multi specialty	46.69	44.42	46.68	40.85	42.89	51.58
20 doctors & over	Multi specialty	42.66	49.70	46.04	51.40	52.45	55.57
Community Clinics		33.97	42.98	43.02	43.10	46.22	49.31
Overall Mean		38.71	41.68	42.18	42.53	44.49	47.89
Standard Deviation		(65.72)	(69.57)	(70.85)	(73.70)	(80.62)	(85.00)

Source: Saskatchewan M.C.I.C. compiled by R.G. Beck, University of Saskatchewan.

attributable to different proportions of general practitioners within the multi-specialty groups, but it is equally likely that some of the difference can be attributed to the attitudes of both physicians and patients--in short, to the "ideological" difference between community clinics and other groups. Anderson has suggested that the preponderance of physicians trained in the United Kingdom in the community clinics may have some influence. While the organization of medical practice is roughly similar in the community clinics and other groups, the role of consumers in general management (they were not involved in the medical practice itself) differences in communications between doctors and consumers, and the kinds of doctors who chose to practice in community clinics may all be relevant considerations as well.

Table 9 shows the ratios of hospital visits to initial office visits. While no consistent difference is revealed when solo and group practices as a whole are compared, the community clinics show far lower hospitalization than any of the other kinds of practice represented.

The data in the study of Anderson and Crichton show a roughly similar pattern for two of the community clinics but not for the third, while all three were lumped together for the present analysis. Looking at the three community clinics individually, the different availability of hospital beds in the three communities (Regina, Saskatoon, and Prince Albert) immediately suggests itself as a contributory factor. It has also been suggested that the three community clinics differ in the "ideology" component and in the degree of nature of communication between consumers and doctors.

The element of "ideology" incidentally, can apply to patients as well as to doctors. Possibly influenced by the health education conducted by the community clinics, possibly reflecting the kinds of consumers likely to respond positively to the appeal of community clinics, it has been observed that in many instances the patients of community clinics seek treatment for conditions earlier than do comparable patients of other practitioners. This may well affect the frequency and duration of hospitalization, among other factors.

Table 9

Ratios of cost of hospital visits to cost of  
initial office visit per patient in  
Saskatchewan, average 1963-67

Solo general practice.....	1.44
Group general practice....	2.02
Multi-specialty groups:	
2-4 doctors.....	1.12
5-9 doctors.....	1.11
10-19 doctors .....	2.77
20 doctors and over ...	1.07
Community clinics .....	0.43

Source: See Table 8.

Table 10

Average cost per patient of initial office visit,  
hospital visits, and sum of the two for medium-sized  
multi-specialty groups and community clinics,  
Saskatchewan, 1963-1968

Multi-specialty groups with 5-9 doctors			Community Clinics		
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	First Office Visits	Hospital Visits	Sum	First Office Visits	Hospital Visits	Sum
1963	\$3.44	\$4.24	\$7.68	\$6.05	\$1.03	\$7.08
1964	4.30	4.97	9.27	5.47	2.30	7.77
1965	4.26	4.61	8.87	5.02	2.39	6.41
1966	4.29	5.10	9.39	4.16	2.22	6.38
1967	4.33	4.00	8.33	4.10	2.68	6.78
1968	5.43	5.12	10.55	5.13	2.70	7.83

Source: See Table 8.

Table 10 compares the community clinics with multi-specialty groups of similar size, in respect of initial visits, hospitalization, and the sum of the two. The lower cost of hospitalization for patients of the community clinics clearly results in lower over-all treatment cost as well. This would also appear to be the conclusion of Anderson and Crichton. Fate seems to conspire to keep the data from Saskatchewan from any simple interpretation, however, and as a final caveat it should be noted that the "initial office visit" to which hospital visits are compared, can be billed for an initial visit that takes place in hospital as well as in the doctor's office! This is fairly infrequent however, and the cost advantage of the community clinics in hospitalization is large enough to appear to override all of the difficulties of interpretation.

The distinctive hospitalization experience of the Saskatchewan community clinics is, incidentally, reflected in at least one Ontario community. A study of the Sault Ste. Marie Group Health Centre(1) showed that, by comparison with individuals receiving medical care from independently practising physicians in the same community, members of the group had the following characteristics:

- 24 per cent less time in hospital, mainly because of a lower admission rate;
- fewer surgical operations;
- a lower rate of early readmission to hospital following discharge;
- more likely to have seen a doctor at least once during a 12-month period;
- more likely to receive immunizations and check-ups;
- more x-ray and laboratory investigation, particularly on an out-patient basis;
- more likely to be attended by an "appropriate" specialist.

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(1) Hastings, J.E.F., Mott, F.D., Barclay, A., and Hewitt, D. "Prepaid Group Practice in Sault Ste. Marie, Ontario, Part 1: Analysis of Utilization Records", in press, 1972. Preliminary data were published in the Canadian Journal of Public Health (1970).

Costs in Ontario cannot be calculated on a basis comparable to the Saskatchewan billing data, but in early 1972 the Sault Ste. Marie centre was being paid \$6 per member per month capitation fee by the province to cover all the medical care needs of its members. Dividing the fees paid to all fee-for-service practitioners in Ontario by the total insured population an equivalent "capitation" of \$4.90. is obtained. With hospitalization in Ontario running at a little over 2 bed-days per capita per year (1/6 day per month), 24 per cent less hospitalization for the Sault Ste. Marie centre members would be a saving of 1/24 bed-day per month. The average per-diem cost of Ontario general hospitals in 1972 is estimated to be about \$60, so a saving of 1/24 bed-day comes to \$2.50 per month. Taking into account the \$6 capitation compared to the \$4.90 provincial figure, this means a net saving of \$1.40 per member per month in the total cost of ambulatory and in-patient care.

Statistics of the community health centres in Ontario are continuously monitored by the provincial government, and data that became available in September 1972, after the study was completed, showed that hospitalization rates of the Sault Ste. Marie group health centre had risen and that the net saving of \$1.40 had been converted to a net deficit. Only time will tell whether this was a temporary phenomenon, and further study of both physicians and patients will be needed to explain why it occurred, although clearly one contributing factor was that the number of hospital beds in Sault Ste. Marie was determined independently of health centre planning.

## ECONOMIC ANALYSIS

### IMPLICATIONS OF THE STATISTICAL FINDINGS

As regards economies of scale, the fact that the statistical comparisons of group and nongroup physicians and of large and small groups do not show any consistent pattern is in itself a significant finding.

Far too little is known about the nature of the production function in medical practice for one to assert that economies of scale are bound to occur. In this, medical practice is no different from other industries. Economies of scale usually respond to technical considerations of the production process. Within limits, a larger steel-rolling mill will have higher output per unit input than a smaller one. Other things being equal (i.e. soil, climate, human and physical resources, seed, feed, fertilizer) one size of farm will prove more economical than another for the production of a given crop. On the other hand, studies of other activities (including the hosiery industry and the production of automobile tires) have provided examples of processes where small firms are competitive with large ones and no significant economies of scale are apparent.

While very few studies of physician productivity have been made in Canada, one recent analysis(1) has suggested that the output per physician hour would be optimized by the use of 3 to 4 aides per physician, and this figure is more commonly approached in large groups than in solo practice (see Table 1). A comparative study of the work of internists in Canada and the United States(2) concluded inter alia that the work done by Canadian internists was much the same in group and in solo practice.

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(1) Reinhardt, U.E., "Physician Productivity, the Supply of Physicians, and the Physician Shortage' in Canada", unpublished paper presented at the meeting of the Canadian Economic Association, St. John's, June, 1971.

(2) Vayda, E. and Kopplin, P. "Internists in a Consumer Sponsored Group Practice Programme", Canadian Journal of Public Health, January-February, 1972.

Studies in the United States are more numerous, and while one author claims to have identified economies of scale(1) most studies(2) have failed to demonstrate such economies and have shown that groups tend to incur higher costs per patient than solo practice, and that group members tend to work fewer hours per week or year than do solo practitioners.

It has been suggested that factors other than size or the scale of operations may be operative in reducing the cost of patient care in community health centres. Principally, that economies in out-patient care may arise from the patterns of organization of medical practice and the methods of paying the physician. Most medical groups in Canada are organized on the basis of a physician group collecting fees for services performed, distributing this income according to a variety of partnership agreements that range from equal shares to a flat percentage of billings generated by the member in question, and managing the premises through a separate management corporation owned by the same physicians. Supporting staff are hired by the group and their salaries are met from the fee income of the physicians. It seems to be generally accepted that physicians in such groups, like those in solo practice, have annual personal income targets that operate, through the fee structure (the array of different fees for different procedures) to influence the care provided to patients.(3) To the extent that the volume of service provided is determined by the capacity and income aspirations of the physicians, any efficiencies that are achieved by transferring work away from physicians are likely to be compensated by at least some pressure to raise fees, or to increase the services per patient, in an effort to maintain incomes.

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- (1) Yett, D.E. "An Evaluation of Alternative Methods of Estimating Physicians' Expenses Relative to Output", Inquiry, March, 1967.
  - (2) To cite only a few: Newhouse, J.P., "The Economics of Group Practice", The Rand Corporation, Santa Monica, Cal., May 1971. Bailey, R.M. "Economics of Scale in Medical Practice", in H. Klarman, editor, Empirical Studies in Health Economics, Johns Hopkins University Press, Baltimore, 1970. Yankauer, A., Connelly, J.P., and Feldman, J.J. "Physician Productivity in the Delivery of Ambulatory Care", Medical Care, January-February, 1970.
  - (3) Cf. Task Force Reports on the Cost of Health Services, Department of National Health and Welfare, 1969, Vol. 111, Report of the Task Force on the Price of Medical Care, Recommendations 12 and 17 and pp. 219-227.



The adoption of salary, capitation, or other payment systems that remove the incentive to maintain income through higher fees or more services per patient has been suggested. This can be interpreted as a shift from "piece work" to "time work" as the basis for remuneration, and while this appears to be an acceptable alternative to fee-for-service, particularly for the more recent medical graduates, savings achieved in this way are obtained by preventing physicians' incomes from rising to satisfy their income aspirations as they would tend to under fee-for-service. This might have the effect of transferring the pressure on cost increases from the fee structure to salary or capitation negotiations, but would probably make it easier for the agencies that engaged the physicians to restrain income increases. Note that a straight salary system of remuneration is incompatible with the traditional concept of independent practice, because the freedom of the physician to change his income by changing his output is removed, and that it would require the establishment of public or quasi-public agencies to operate the practices (health centres) if the freedom of physicians to generate more income independently is to be removed effectively.

There is a simple arithmetic that helps to understand the relationships involved: If it is desired to control the amount spent for patient care, then the sum of money devoted to that purpose acts as a constraint and the only changes that can be made are those which reallocate the amount of money among the factors of production (physicians, other personnel, machines that can be substituted for people). If it is desired to achieve greater output for the same expenditure, this would require a shift from higher-priced resources (physicians) to low-priced resources (other personnel or automated equipment) and result in lower incomes per physician if the same number of physicians is employed in the system. If the maintenance of income per physician is an absolute condition for establishing that system in the first place, then fewer physicians can be employed.

It is not possible, however, to analyze the system in terms of out-patient care alone. Two other components of a "total care system" are hospitalization and social services. Hospitalization has traditionally been an integral part of the patient care system, and the introduction of social services is a more recent phenomenon.

So far as hospitalization is concerned, the statistical findings do indeed suggest that on the whole group practices tend to have somewhat less hospitalization than solo practices in comparable fields, and that this tendency is more pronounced in the case of highly structured groups with an ideological basis (such as the few existing community clinics and community health centres in Canada) and in groupes (exemplified by the Kaiser clinics in the United States) where a financial rather than an ideological incentive to hospitalize fewer patients is involved.

The savings that occur from reduced hospitalization are of different kinds. When specific diagnostic techniques are employed in out-patient centres rather than in hospitals the "hotel cost" component of the hospital bed-day of stay is eliminated (in effect, the patient continues to pay for his own bed and board in his home rather than receiving it from the hospital), and the costs of the diagnostic procedures (e.g., laboratory and x-ray work) are transferred from one health care institution (the hospital) to another (the medical practice) where they may or may not be performed at a different cost.

In a study of 1966/67 data for selected Toronto hospitals (1), the components of "hotel cost" and "treatment cost" were calculated separately, with administrative expense prorated. Hotel cost amounted to 27 per cent of total cost in general hospitals, 41 per cent in chronic hospitals, and 56 per cent in convalescent hospitals. These are the amounts transferred from the hospital system to the individual when work is transferred from an in-patient to an out-patient basis.

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- (1) Eleta, G.F., A Study of the Organization, Administration, and Experience of the Home Care Program for Metropolitan Toronto, M.Sc. thesis, School of Hygiene, University of Toronto, 1969.

When a case is treated in a different way (e.g. by medical rather than surgical methods) fewer total resources may be committed to the care of that case and--if the outcome is the same or similar--a more substantial saving may be generated. The arithmetic deserves careful attention. To choose one example the alternatives of thyroid surgery or the administration of radioactive iodine both require a variety of highly skilled labour inputs, both involve expensive capital equipment, and may well be closer together in cost than the intuitive notion that "surgery is always more expensive" would suggest.

When the provision of out-patient facilities makes for easier access to medical care and results in earlier diagnosis and treatment than would otherwise be the case, it may be possible to prevent some conditions that otherwise would require hospitalization. This is, of course, a short-run saving, for it is impossible to predict what the total effect would be on the demand for hospital services for all purposes over the whole life-span of the patient.

The reduced demand for hospital service that may occur through a shift to ambulatory care is really similar--in its effect on the cost of the hospital system--to the reduced utilization that may occur because of more efficient administration within the hospital itself (earlier discharge, more efficient handling of cases resulting in shorter average stay, use of low-priced hostels for patients on day surgery or day treatment programs resulting in less use of hospital beds, etc.).

The effect on total hospital costs, it is clear, can result only if the alternative methods of treatment are used instead of and not in addition to hospital care, and if the total number of hospitals and hospital beds available is reduced in step with the reduced demand. An example is the current planning for a community health centre near the proposed Ottawa-Carleton Hospital in Ontario, where it is expected that the hospital will have fewer beds and less out-patient treatment space than would have been indicated in the absence of the health centre.

If the effect of community or other types of health centres or group practices is to free hospital beds for the treatment of other patients with complaints (i.e., if there is a large reservoir of unmet need or demand which can only be satisfied when beds become available) the net effect is to provide in total more medical care for the community. This may well be needed, but the end result is more care, or perhaps better care, rather than lower expenditure.

In the absence of such unmet demand, if the effect of transfers from in-patient to out-patient treatment is to leave hospitals with the same number of beds but lower rates of occupancy, the total cost of medical plus hospital care for the community may well be higher than before since it is necessary to maintain the physical plant and a substantial number of staff even for the treatment of fewer patients in the hospital. For this reason, the planning of out-patient services must be done in coordination with the planning of in-patient services so that the potential economies can be realized in practice.

The recent scaling-down of acute general hospital bed targets deemed to represent "adequate provision" of beds from 5 to 4 per thousand population in Ontario and to 3.5 in Quebec is a step in the desired direction, and demonstrates that health planners do in fact recognize the need for reducing the number of beds in circumstances when more efficient out-patient care is in prospect and no major reservoir of unmet demand is anticipated.

Before leaving the question of hospitals, it should be noted that transfers of patients out of hospital normally will not reduce costs in the same proportion as the numbers transferred, even when the number of beds is simultaneously reduced, because the cases transferred to the out-patient system will tend to be the least difficult, so that the patients remaining in hospital will result on the average in more intensive and complex (and therefore more expensive) care per day or per case than before.

The "casemix" of the hospitals will also be influenced by the method of paying physicians. Under fee-for-service, there is the possibility that physicians whose other sources of income from practice are limited would hospitalize more patients, in the absence of any rule or financial incentive to the contrary, as part of the drive to realize their income aspirations. In the case of surgeons -- for whom the hospital is an indispensable workshop--the well-known correlation between the number of surgeons per thousand population and the surgery performed on that population speaks for itself.

As regards social services (including the services of psychologists and community mental health workers) their introduction into medical groups or community health centres will depend on policy. It could be limited to a transfer of existing personnel from other premises to the new centres, in which case minor economies in occupancy and administrative expense might be anticipated. If the

process involves an increase in the total staff devoted to these functions by the community, total expenditure would clearly be higher. It is tempting to speculate whether an attack on social problems through community centre personnel would have a measurable impact on people's health and result in lower treatment costs, but social work is largely palliative in any event and can hardly find solutions to problems of unemployment, poor housing, malnutrition, etc., in the absence of supportive general economic policy measures.

So far as the statistics provide a guide, they suggest that the cost of treating a patient on an outpatient basis is much the same in different kinds of practice, with the more elaborate supporting personnel and diagnostic equipment of groups sometimes resulting in higher cost, and with a bewildering array of apparently almost randomly-distributed cost differences for different sizes of clinics, fields of practice, sizes of communities, etc. The statistics also suggest that large groups, particularly those with a conscious community orientation, tend to have lower hospitalization rates than other forms of medical practice. This finding is not completely unambiguous, for (as in the case of Saskatchewan) hospitalization rates have also been shown to be influenced by the availability of beds, and it is difficult to assign primary causality to "groupishness" or community-mindedness of bed availability. Nevertheless, this area of the transfer of functions out of the hospital to the medical practice is the one where potential economies would appear to lie. On the hospital side, these economies can only be realized if hospital planning is coordinated with out-patient service planning and the one contracts as the other expands. So far as the medical practice is concerned, the conscious orientation to less hospitalization seems to be an important factor, whether motivated by ideology (community-mindedness) or, as in the American case (Kaiser) by financial hospitalization, with attendant savings for the health care system; whether they will do so as a general matter depends as much on the financial and administrative rules, and on the education of the practitioners involved, as on the absence of counter-incentives embodied in the fee structure under fee-for-service payment, or at the least the presence of some countervailing positive incentive for fee-for-service practitioners to hospitalize fewer patients.

#### IMPLICATION FOR GOVERNMENT POLICY

There are very many reasons beyond the economic for which governments may wish to establish community health centres--reasons relating to the quality of health care and of social service, consumer acceptance, and effectiveness of health service delivery apart from

considerations of economic efficiency(or cost-effectiveness). If it is desired to encourage the establishment of community health centres for any or all of these purposes, certain policies must be observed if governments are to gain the maximum dollar advantage as well.

The coordination between hospital and health centre planning has been discussed in the previous section. If community health centres are established without any corresponding change in the availability of hospital beds, the principal source of money savings will have been jeopardized. Particular short-run economies may be realized by direct conversion where-ever existing premises can be remodeled for less than the cost of new construction(which is by no means always the case). When small and inefficient rural hospitals are phased out, for example, consideration should be given to the use of structural shell and some part of the finished interior and equipment to house medical practice and social services - possibly with holding beds for emergency use and utilization of an existing operating room for minor surgery. The same consideration might apply in converting a closed-down wing or service in a larger hospital to outpatient service in cities. In addition, coordination can be simplified (and economies realized when central services can be shared) when it is possible to locate a health centre adjacent to a hospital or in the same grounds, even where closure and remodeling of the hospital are not involved and the number of hospital beds is not to be reduced. Advantages would accrue from the use of hospital central services (laundry, heating, laboratory, X-ray) by the health centre. In such cases, of course, the most logical solution might be to make the centre administratively a part of the hospital itself rather than an independent institution.

The present tendency in many provinces to consolidate the administration of hospital and physician services in single provincial commissions or departments will facilitate the needed coordination, particularly when joint planning of services is undertaken centrally as in Quebec at present.

The government will be faced with a decision about the method of payment of physicians as well. It has been suggested that there may be some inherent tendency towards over-service in fee-for-service practices and to under-servicing or over-referral in salaried or capitation practice.(1) To the extent that this holds true, the adoption of incentives or compensatory mechanisms appropriate to the form of remuneration may prove quite as satisfactory a solution as a

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(1) Hogarth, J. The Payment of the Physician, Pergamon Press, London, 1963



change in the system of remuneration. It should be understood, of course, that fee-for-service, capitation, sessional fees, and salaries are not flat alternatives, but that they can exist simultaneously and without conflict. Even today, when medical care plans see most group practices as recipients of fees for service, some groups pay these fees to their members, others pay annual salaries or sessional fees, and provincial plans pay some groups on a capitation basis.

Experience in a number of provinces has shown (1) the possibilities of compensating a tendency to over-servicing of patients by administrative action involving the use of computerized practice profiles, peer review, and eventual sanctions. In a salaried service, the appropriate mechanism might be periodic review and evaluation in the form of an internal or external audit. In Ontario and Manitoba, the medical care plans have on occasion used the filing of "dummy bills" by salaried practitioners as a means of entering them in the computer for comparison with their fee-for-service confreres.

If physicians are expected to build and operate community centres on their own initiative, a fee-for-service or capitation basis of payment would be required to provide an income incentive, while with a salaried service there would be no comparable incentive for physicians to build and man the centres, and third party ownership (consumer groups or provincial government appear the most likely alternatives) would be indicated. Consumer groups might be expected to provide at least part of the initial capital themselves, while in the case of government ownership the traditional sources of public revenue (taxation and borrowing through bond issue) would be involved. In the case of physician ownership, it might be possible to resort to the private capital market directly whenever the earnings prospects of the group looked favourable, but incentives in the form of guaranteed loans, subsidized rates of interest, and possibly direct grants, could be used to influence location.

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(1) Despres et al., op. cit.



On the consumer side, governments will have to decide to what degree patients can be expected to gravitate to community health centres naturally, either because of the service provided or the absence of alternatives. Where alternatives exist, as in larger communities where such centres may exist side-by-side with traditional office practice, a rather difficult issue arises. Typically, the residents of a province pay a combination of premiums and taxes (with certain exception in the case of the very poor) that can be said to purchase an entitlement to choose any available medical care that they desire. If it can be demonstrated that community health centres deliver care more efficiently (i.e., at lower cost for the same service) than other delivery systems, it is discriminatory for consumers to contribute the same amount in taxes and premiums where some choose a cheaper, and others a more expensive alternative. This might justify the selective withdrawal of reimbursement of fees for services that are locally available at lower cost through community centres, or making the fee payment to certain specialists conditional on centre referral, with the eventual goal of inducing practitioners to relocate in such centres. Thorny political and administrative problems are involved, but so is the question of economic equity. There should, in any event, be less argument with the proposition that the consumer who chooses a more expensive service, when medically equivalent care is available through community health centres at lower cost, should have to pay for his choice, possibly by having to pay out-of-pocket the difference between the cost of providing the service in a centre and the fee for equivalent service that he chooses instead.

Above all else, government planning for people's health must recognize the economic indivisibility of the health care system as a whole. That is, even when physician care, hospital care, and public health fall under different and perhaps autonomous administrative authority, the share of national product devoted to the health care sector comes from a single source. Its allocation among the agencies or functions involved in the health care system will depend on the reconciliation of wants, needs and technical and policy considerations, but even when the money for some part of health care arises from premium payments while the rest comes from the general tax base of the country, the province, and the local community, the total amount can be viewed as a single transfer payment. The greater the freedom to reallocate funds among the various functions that comprise the total health care system, and the greater the emphasis on coordinated planning for the system as a whole, the greater is the probability of achieving the most rational use of resources. Freezing the pattern into fixed shares for given classes of institutions

deprives the system of its needed flexibility. The arguments that have been used in the past to justify global or program budgeting rather than line-item budgeting for individual institutions such as hospitals apply with equal force to the total system. If governments are to get optimum advantage from community health centres or any other innovation in health care, they must be able to shift both financial and human resources within the system to achieve their goals. Reconciling the needed planning and control with the rights of the individual is a political and administrative challenge that must be met if the system is to be workable and if potential economies are in fact to be realized.

Finally, it should be noted that structures alone do not guarantee the kinds of savings that accrue from lower hospitalization rates, even in the absence of financial incentives to hospitalize patients. The finding that the "low-hospitalization advantage" is greater for community clinics than for groups in general means that the style of medical practice and the attitudes of physicians and patients are important in achieving economies. Health education of the public has been a traditional function of health departments in Canada; to realize maximum savings from community health centres - once they become a general structure rather than an experimental system staffed largely by devoted and highly-motivated personnel--some form of "utilization education" of both doctors and patients will clearly be needed as well.

Finally, while it is not central to the argument, mention should be made of the inseparability of providing health care and training future practitioners. A shift away from hospitals to out-patient services has implications for medical education that must be taken into account. In addition, whether teaching is carried on in hospitals, in community health centres, or in both, it should be kept in mind that no "true" separation of costs is possible, and that the apparent cost that can be calculated is based on quite arbitrary accounting conventions. Such cost calculations give no valid basis for policy decisions when sharing between the health and education budgets of government is proposed.

## OTHER SOURCES OF SAVINGS

### CAPITAL COST

The capital cost, or initial cost of construction and equipment, of a health centre, inevitably attracts attention because it represents a large once-only expenditure. Savings in capital cost can be achieved by the selection of low-cost designs and specifications, and even greater savings can be achieved through subsidizing the rate of interest. It must be emphasized, however, that these savings are not unique to community health centres but could be achieved in the same way for any health care premises. It should also be noted that capital costs are a relatively small element in total expenditure and that a major reduction in capital cost would bring about only a small percentage reduction in the overall cost of health care.

In terms of 1972 prices, the overall cost of construction in Canada runs between \$40 and \$45 per square foot on the basis of the specifications and standards employed for general hospitals. Using somewhat lower standards, such as those applying to approved nursing homes, the cost would run between \$20 and \$25 per square foot. Construction to the standard of the ordinary private house would be near \$20 per square foot, on the basis of C.M.H.C. data for 1970 showing an average cost of \$14.93 and a range from \$13.28 in Moncton, New Brunswick to \$19.10 in Windsor, Ontario, exclusive of land cost.(1) The nature of health centre construction is, of course, dictated by technical considerations. The simplest type of centre with examination rooms and a waiting room might cost \$20 per square foot, but an emergency area equipped for minor surgery would cost as much as \$65 per square foot. While the land assembly and acquisition costs range from roughly half as much again for prime locations in Toronto to perhaps 10 per cent of construction cost in small communities with cheap land, health centres cannot always take advantage of savings in land because they must be located in built-up and serviced areas where land costs are already fairly high.

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(1) Central Mortgage and Housing Corporation, Canadian Housing Statistics 1970, Table 86.

Where public acceptance cannot automatically be assumed, additional costs may have to be incurred by health centres in order to attract attention through the aesthetic design and comfort of the premises. This has cost implications. The community health centre in St. Catharine's, Ontario, for example, was built in 1969 at a cost of \$33.67 per square foot, and, in the words of the architects, "while certain elements are above average in cost, such costs must be related to the quality of both functional and aesthetic aspects". (1) External facilities such as hard-surfaced parking area and landscaping can add another 8 to 10 per cent to total cost.

The terms "leasing" and "lease-back" are sometimes encountered as alternatives to construction and ownership of facilities. One inescapable fact is that when premises are leased the landlord's profit must be added to the other costs. Leasing costs more in the long run, but it does enable an agency without capital to occupy premises built with someone else's capital. The use of the capital, as well as the landlord's profit, must of course be paid for.

Leasing is somewhat different as it relates to public and private clinics. In the case of a private clinic, leasing provides tax deferment for the principals, but it is not yet clear whether the advantage would be the same under the tax reforms of 1972 or whether a physician-owned corporation that leased a clinic and its equipment to the group practice and did no other business would qualify under the new law.

In the case of a government, leasing and lease-back (which involves constructing a building, selling it to a private owner, and then renting it back) are attractive political arrangements that have the short-run advantage of enabling governments to present budgets that mask true capital costs. There is no true economic advantage unless the agency in question actually has the opportunity to use its capital at a higher rate of return than by investing it in health centres, and the leasing or lease-back arrangements frees the capital for such use.

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(1) David K. Landsdowne and Alan J. Ross, "3 Cost", Canadian Architect, August 1969.

The cost of money is probably the most important single cost element. If a building costing \$100,000 is built with a 10 per cent down payment and the remainder financed by a 25-year mortgage at 10 per cent interest, amortized fully at the end of the period, with interest paid on the declining balance, the total interest paid will be \$135,000. Half of this would be saved if a subsidized interest rate of 5 per cent were available, but there would be no saving to the community as a whole since tax revenues would have to be used to provide the subsidy.

To illustrate capital cost, a health centre of 8,500 square feet was proposed in 1971 to serve the 13,000 population of the Farnham district in the Eastern Townships of Quebec.(1) It was estimated that when fully occupied the premises would accommodate 1 administrator, 1 administrative assistant, 5 secretaries, 6 social workers, 2 technicians, 13 nurses, and 4 physicians. Assuming the cheapest Quebec construction cost (\$18 to \$20 per square foot) for nursing homes, plus the higher cost of a lead-shielded x-ray installation and an emergency room capable of minor surgery, an overall cost of \$23.50 per square foot, for a total cost of \$200,000 seems reasonable. Assuming a subsidized mortgage at 5 per cent for an initial amount of \$180,000, the total of interest, amortization, maintenance, insurance, and other costs included in the accounting definition of "occupancy cost" would run about \$25,000 per year, compared to a general operating budget of \$450,000 or roughly 5.5 per cent of total operating expense. It would be safe to assume 5 per cent as a "rock bottom" occupancy cost, which is consistent with the 1968 survey of 24 group practices given in Table 1, where the occupancy expense for most groups was 7.0 to 7.6 per cent of gross income, and suggests that a range from 5 to 10 per cent would cover most situations encountered in Canada.

A broader spectrum of activities would require more space. Applying to Farnham the proposed designs of the Scottish Home and Health Service(2) which include a health education room and physiotherapy facilities as well as a dental suite, 10,000 rather than

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- (1) Projet de C.L.S.C. de démonstration - C.L.S.C. de Farnham, Comité de planification des services de santé des Cantons de l'Est, Service de Développement, July, 1971.
  - (2) National Health Service, Health Centre Design Guide, unpublished draft, 1972.

8,500 square feet would be required. If one might economize slightly by eliminating a parking area from the Scottish design, the Canadian equivalent would need a substantially larger parking lot for cars. Expanded functions that require an expansion of space from 8,500 to 10,000 square feet would mean between 15 and 20 per cent increase in capital cost compared to the original design.

On the other hand, a capital cost saving of 20 per cent, if it led to a similar saving in annual occupancy cost, would yield an overall saving of 1 to 2 per cent in the total cost of health care provided, depending on the per cent of total cost represented by occupancy. Such a saving could be achieved by cutting the rate of interest from 10 to 5 per cent, or by reducing construction costs from \$25 to \$20 per square foot (or from \$23.50 to \$18.80 if the latter figure were still realistic). If the location is dictated by the population to be served, so that land costs cannot be varied; if the construction cost per square foot depends wholly on technical specifications; if the calculated space is the minimum that will serve; then the principal saving (not counting any compensating increase in taxes) could most likely be achieved by subsidizing the rate of interest.

Finally, it should be noted that space requirements will change with the diagnostic and treatment services provided. As recently as the mid 1960's(1) it was possible to find general hospitals designed on the basis of 500 to 600 square feet per bed (total space divided by the number of beds). This has now risen to 800 feet or more for general hospitals, and as much as 1,500 square feet for teaching hospitals--mainly because of the additional areas needed for sophisticated diagnostic and treatment services. A more limited trend in this direction will probably occur in the case of community health centres, and should be foreseen in their planning.

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(1) Wheeler, E.T. Hospital Design, McGraw Hill, New York and Toronto, 1964.



While foreign experience is not necessarily relevant, the provisions of recently-introduced American Legislation are rather interesting. Bill H.R. 11728, the Health Maintenance Organization Act of 1971 (introduced in November 1971 and still under analysis in mid-1972), provides for construction loans not to exceed \$2,500,000 per project, covering up to 90 per cent of cost, and with subsidized interest at a rate of no lower than 3 per cent per annum. The most important part of this proposal, from an economic point of view, is not the size of the maximum loan per project but the subsidized rate of interest.

It should, of course, be clear that under fee-for-service medical practice no financial advantage would accrue to the community as a whole from subsidized loans to physician-sponsored groups, except through the income tax paid by physicians on higher net earnings. On the other hand, community-sponsored health centres, operated on a not-for-profit basis with salaried medical staff, could provide care with a lower provincial budget if interest were subsidized by the federal government, and this would, indeed, provide yet another equalization payment from high-income to low-income provinces through the tax mechanisms.

#### SOME TRIVIAL AND NON-TRIVIAL SAVINGS

An interesting question was posed to the economists concerned with this portion of the study: What is the most economic use in providing ambulatory health care of doctors (general practice, basis specialists, general internists, obstetricians, gynaecologists, paediatricians, geriatricians, more specialized types of specialist), screening and preventive services, public health nursing, other nursing (registered nurse, nursing assistant, nursing aide), diagnostic laboratory services, diagnostic radiology services, rehabilitation medicine, including physiotherapy, pharmacy, dental care, mental health services (psychiatrist, therapist, etc.), social worker (mental health, family case work), health education, information and referral service, minor emergency and dressing station, optometry, podiatry (chiropody), home care, day care for ambulatory patients, lay health worker or members' relations worker, chiropractic, osteopathy?

The answer to this rather long question is really rather short once certain basic information is made available, once the legal responsibility of each health worker is defined, once the technical scope of his activities is agreed on, and once the cost is known. The most economical use of each can then be established



on a "market area" basis--i.e., in terms of the catchment area that will provide full employment for the personnel and associated capital equipment involved. This kind of approach underlies the plans for health centres being suggested in the United Kingdom.(1) The British plans for a centre serving a population of 10,000, for example, include waiting areas, office space, consulting rooms for general medical service, a dental surgery, a chiropody room, a health education room, a treatment room, and a "clinette" for simple procedures such as urinalysis. A centre serving 20,000 people would have more space for these activities plus a physiotherapy/rehabilitation room and a storeroom and a dental x-ray room. A centre for 30,000 people would have more space for these activities plus x-ray equipment for medical diagnosis and changing cubicles.

Diagnostic laboratory services are an example of the criteria involved in making decisions. The general economic recommendation is to situate them where highest output is available at least cost, with appropriate technical controls over quality and administrative controls over needless use. The actual location decision will require operations research techniques. There are arguments for small laboratories within health centres, so long as the volume of work justifies the use of space, equipment, and personnel for that purpose. The principal payoff is rapid and direct communication between the physician and the laboratory with a consequent reduction in waiting time for physician and patient alike. An argument for larger central laboratories can be made in terms of economies of scale (which can indeed be demonstrated for some capital-intensive procedures in particular), quality controls, and the ability to perform more sophisticated tests. Waiting time for results may increase, compared with a local laboratory. Vehicles and personnel for transportation of samples are needed. If waiting time is to be reduced in this setting, special communication facilities (direct telephone, telex, etc.) may be required. Transportation and communication costs will vary from urban to rural areas and even within cities. Such a problem seems made to measure for the operations researcher.

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(1) Health Centre Design Guide, op.cit.

Economic considerations arise when the decision has to be faced whether to charge for laboratory services as technical services or as physician fees. Assume, for instance, a community of 50,000 located in a densely-populated rural area with an additional 50,000 population living around it. Given appropriate data on which to base a decision, assume that the operations researchers recommend the establishment of a central laboratory within the area to service the network of community health centres. At this point the decision must be made whether to permit a private pathologist to establish the laboratory, to put it under the public health department, or to expand a hospital laboratory for the purpose. So long as the traditional fee-for-service system is applied to laboratory services, the private pathologist can set up a laboratory, have the work done by salaried technicians, and receive payment for each procedure on the basis of a fee set on the basis of a schedule whose origins go back to the days when physicians themselves performed the tests and interpreted the results. It should be noted, however, that revised fee schedules are slowly adapting to the new situation. A subsidiary decision relates to the choice between manual and automated procedures on the basis of workload, salary levels, the capital cost of automated equipment and the difference in precision and specificity between manual and automated procedures at the present state of the art.

Certain domiciliary services (medical or nursing house calls, physiotherapy, speech therapy, homemaker services) provide an alternative to the hospital or nursing-home bed, but the saving over institutional care must be weighed against the loss of patient-contact time incurred because of travel time of the personnel concerned. While in the balance the calculation often favours the home care system, no hard and fast rule can be given and each community must have its needs, resources, and costs examined on an ad hoc basis. In this analysis, the effect on hospital costs (i.e. on occupancy rates) must be included, and the possibility of reducing the number of hospital beds to compensate for the shift in workload must be explored.

Savings arising from screening and preventive activity are based on the assumption that early diagnosis and prevention imply a reduction in subsequent treatment costs. This has yet to be demonstrated conclusively, but the studies cannot be discussed here because they are clinical rather than economic in nature. Any screening or other preventive activity that can be demonstrated to result in a decline in the demand for hospital beds or out-patient care will only provide savings if the reduced demand is

accompanied by reduced supply of the facility whose use has been "economized". In the very long run, it seems plausible that individuals whose lives are extended through prevention and early diagnosis and treatment will require more intensive personal health care at a later age when the chronic and degenerative diseases of old age make their appearance, and that savings over the entire life cycle of the individual will be less than the immediate savings.

As regards the different categories of health workers (nurse practitioners, midwives, nurses' aides, therapists of various kinds) manpower experts have for a number of years been aware that a "team" approach potentially can generate economies of physician time. The author was informed, during a visit to the Mount Carmel community clinic in Winnipeg, that some physicians found their output per hour sufficiently increased by the use of well-trained nurses to do the preliminary work-up of each case, that they voluntarily contributed half of their fees to the clinic to support its general activities. Once again, the "ideological" component--the dedication of the individuals concerned--cannot be overemphasized.

Just as the transfer of functions from hospitals to community health centres can only result in economies if the community centres are viewed as doing the work instead of and not in addition to the hospital, so within such centres the devolution of duties from one class of health worker to another must involve a true substitution of nurse practitioner or midwife for physician, group of single-specialty health workers for group of polyvalent registered nurses, etc. Unfortunately, there is often a tendency for the introduction of new supporting staff on a team to result in more (or better) work being done rather than the same work as before being performed at lower cost. Emphasis on out-patient service requires a phasing-out of some hospitals and beds in order to achieve economies; the introduction of lower-level personnel must similarly result in the phasing-out of higher-level personnel to achieve the same end. Perhaps the experience of the Soviet Union can provide a cautionary lesson in this respect. The role of the feldscher (assistant doctor) is well-known. Much talk has been heard over the years of phasing out the feldschers now that the physician supply has been increased. The actual number of feldschers, however, has appeared to increase steadily since 1913, with the result that there is now (by Canadian standards) an oversupply of high-level health workers resulting in wasteful and uneconomical utilization of their services--as in assigning qualified physicians or feldschers to emergency duties that in Canada are performed by lower-level ambulance personnel, with only a problematical increase in benefits in terms of lives prolonged by

rapid coronary care and the like. Attention must be given in Canada to achieving both an equilibrium between aggregate supply and demand for health workers, and balanced growth (or contraction) of the individual health professions within the total. In a free market, perhaps, an oversupply of health workers in the aggregate or in individual occupations might be expected to lead to a decline in salaries and lower health care costs, but in Canada, as elsewhere in the world, health care is more and more concentrated in the public sector where hiring is easier than firing, promotion easier than downgrading, and the likely result of oversupply of manpower will be increased rather than stable or decreasing costs. The imperfections of the health services labour market are discussed further below.

Finally, when it is proposed to bring in new classes of non-health personnel into community health services, a distinction must be made between transfers of function and new activities. The introduction of social case workers, for example, is likely to be a transfer activity--bringing in personnel who were previously doing the same work in another location and perhaps with less co-ordination with health services. The gain from improved co-ordination and more convenient location of services is obvious, and there is no reason to suppose that costs would be any higher than when social workers had their separate quarters elsewhere.

The introduction of community workers for the untranslatable job of animation sociale, on the other hand, represents largely a new activity. As community health centres become a general rather than an exceptional facility, the supply of highly-motivated and dedicated members of the community at large is likely to be exhausted much as the supply of like-minded physicians and administrators will be exhausted. Efforts to arouse community interest and identify and stimulate local leadership, like efforts to encourage utilization of the new facilities, will require additional personnel to undertake these additional functions, and this can only be done by incurring additional costs unless some other aspect of the health centre's work is to be sacrificed in compensation. This involves high-level policy decision and does not respond to economic or administrative criteria alone.

## ECONOMIES FROM CENTRALIZATION OF SERVICES

It has been urged that some economies will result from centralized services and purchasing, and hospital experience in this field has often been cited. The results are encouraging in some areas, discouraging in others, and--in terms of the per cent of the total health budget represented by potential savings--are often trivial. Even trivial economies, however, should not be disregarded--particularly when their achievement is relatively simple.

Laboratory services have been mentioned above in connection with economical utilization, and Canadian hospital experience is available as a guide. In Toronto, for example, 6 major downtown hospitals began in 1968 to use a common laboratory for work that could not normally be automated on the basis of the workload of a single institution, and 22 hospitals in the metropolitan area now regularly use its services. This laboratory subsequently developed capability in specialized areas of immuno-chemistry and radioisotope chemistry, which was undoubtedly facilitated by the size of its "market area" but no evidence is available as to whether costs savings, in addition to improved quality and expanded service, resulted from the project.

It has been estimated(1) that in 1966 nearly 90 per cent of all clinical testing in Ontario was done in hospital laboratories and nearly 90 per cent of these tests were performed for in-patients. In medical practice as traditionally organized, it would appear that out-patient treatment does not generate an appreciable volume of laboratory work. Since 1966, however, the introduction of medicare has made it a matter of financial indifference to the patient whether tests were performed in or out of hospital, while medicare provided a new incentive to physicians to start private laboratories. The establishment of community health centres would likely result in a still further transfer of functions from the hospital, including laboratory services, and the use of either regional laboratories to serve a network of health centres, or of hospital-based laboratories

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(1) Chemical Engineering Research Consultants Ltd., Private Clinical Laboratories in Ontario, Study for the Committee on the Healing Arts, Queen's Printer, Toronto, 1969, and Report of the Ontario Hospital Services Commission for 1966, Statistical Supplement, Table G.

inherited from an era of greater hospital use, may both be commendable. If bed use does actually decline, situations might occur when doing outside work would be the only way to keep hospital laboratories fully employed, while their equipment, experienced staff, and supervision by hospital pathologists, would combine to make higher quality an attractive by-product.

On automation, it is worth noting that this is a capital-intensive process with high fixed costs and that a high and stable volume of work can result in lower costs if this work would have been done anyway in the absence of automated equipment. Unfortunately, experience to date has shown savings in unit costs, but sufficient workload being added that no savings in total cost can yet be demonstrated.

The other major diagnostic activity where centralization has been bruited is diagnostic radiology. About half of hospital radiology is done for out-patients at present. Many solo practices, and not only groups, have simple x-ray or fluoroscopic equipment. Centralization has already occurred with the establishment of specialized institutions for deep x-ray and cobalt therapy. Physician-sponsored groups have developed economical methods of handling x-ray work in a number of instances, using their own equipment and technicians and employing radiological services on contract. The contract services are often provided with high efficiency by specialized groups of radiologists. The recent introduction of videotape has further rationalized the use of part-time consulting radiologists. The extension of existing trends seems likely and would make any special action to achieve further economies in this field of doubtful value.

Drug purchase is an area where hospital and provincial-government experience has demonstrated that it is possible for large-scale buyers to obtain concessionary prices from manufacturers and distributors, and community health centres may wish to associate themselves with hospital buying consortia or with centralized government purchasing services. To an economist, however, there remains the risk that these gains are compensated by high prices in the remainder of the drug trade. Unless price concessions lead to greater total output than before, and the scale of operations is such that this occurs on a declining segment of the firm's marginal cost curve, there is no long-run incentive for the producer to offer quality discounts. Most drugs used in Canada are formulated locally from basic chemicals produced elsewhere--often by large international firms--and the only economies that would apply to the economy as a whole (as against individual provinces, groups of



hospitals etc). are those arising from the choice of lower-cost foreign producers. This, in turn, may run counter to national employment policy because Canadian jobs would be lost in the process. The real savings which have been realized to date, therefore, do not constitute an indication that long-run savings in the nation's total drug bill are feasible via the quantity-purchase route.

While hospitals have on many occasions gotten together to support central laundries, much of the cost advantage appears to come from the adoption of standardized sheets, pillowslips, etc. The laundry of community health centres would consist mainly of uniforms, small drapes, and patient gowns, which are less amenable to standardization. It is likely that the use of disposable items would offer greater economies than the use of a central laundry, unless a nearby hospital or central laundry were already available and could undertake the work at cost.

The economies that can be realized by the use of centralized catering and cleaning services vary with individual circumstances. Such services are usually provided by private contractors on a profit basis, and would be most appropriate for small centres that could not economically maintain their own cleaning staff (for food service is of minor importance in an out-patient setting). This would appear to be more a matter of local administrative decision than one of general policy.

Similarly, the advantage of centralized accounting and data processing services would depend on the scale of operations. Standardization of records would certainly facilitate the ease of transfer of data from one institution to another, and epidemiologists have recognized the advantages of record centralization and linkage for research purposes. Significant cost savings, however, are less likely.

#### CENTRALIZED MANPOWER PROGRAMS

A medical school that sends its graduates to provide health care throughout a province is an example of a centralized manpower resource. The lack of co-ordination among Canadian medical schools, and between medical educators and the services that consume their product in the long run, has been recognized at national manpower conferences but has not yet been remedied. Training for the other health professions is usually undertaken by more numerous and smaller units such as hospital schools of nursing or community colleges and could profit from similar co-ordination.



Within individual provinces, there are obvious advantages to centralized recruitment, since a central personnel agency would have information not available to individual health centres and could match job seekers with vacancies more effectively. There are also dangers in too much centralization, and the adoption of province-wide collective bargaining, with flat rates of remuneration for all personnel in the different categories, both deprives individual institutions of flexibility and fails to recognize cost-of-living and labour-market differences within provinces or regions.

Perhaps the most important way in which manpower services could facilitate the provision of health care would be through co-ordination of planning and the transfer of information. If all Canada would become a single labour market, with information on all job openings and applicants for employment universally available to health care institutions and educators, local imbalances could be substantially smoothed. A necessary precondition for this "smoothing", however, is the adoption of uniform standards, licensing criteria, and job descriptions and classification by all the units of government and health care institutions concerned. This seems least likely in the case of physicians and most likely of realization in the case of non-professional personnel.

In this connection, it should be emphasized that the greatest contribution of a uniform manpower policy would be in increasing the effectiveness with which health service objectives are met, but that a corresponding efficiency benefit (in terms of lower cost as well as improved service) is to be hoped for but cannot be demonstrated at this time, while the political and institutional barriers to the establishment of such a policy are numerous.





